

## Section 4-1900 Limestone Overlay District (LOD)

*Comment: Section 4-1900 is a proposed new Section of the Loudoun County Zoning Ordinance to be added as an Environmental Overlay District. The procedures by which the regulations will be applied, including conservation design, will be located in Article VI, "Development Process and Administration," of the Zoning Ordinance (provisions to be drafted). New definitions to be added to Article VIII of the Zoning Ordinance are appended to these regulations for convenience of the reviewer.*

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**4-1901 Purpose and Intent.** A large area just east of the Catoclin Mountain range in the Rural Policy Area of Loudoun County is comprised of limestone, or "Karst terrain" areas. The limestone geology of carbonate deposits is dissolved over time by mildly acidic precipitation, creating fissures. The deposits are highly permeable, allowing surface water to pass through quickly to underlying aquifers and groundwater, and to reappear elsewhere as springs. The terrain is also characterized by the presence of certain natural features, such as sinkholes and limestone outcrops. Thus, development on Karst terrain has a direct correlation to the potential for collapse and the susceptibility of groundwater and surface water pollution, and spring contamination, posing serious risks to public health, safety, and welfare. The provisions of this Section are intended to regulate land use and development in areas underlain by limestone and Karst terrain in such a manner so as to:

- (A) Implement the limestone conglomerate policies of the Revised General Plan;
- (B) Protect groundwater and surface water resources from contamination;
- (C) Reduce potential for property damage resulting from subsidence or other earth movement; and

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(D) Protect the health, safety and welfare of the public.

**4-1902 Authority.** Authority for these provisions includes:

(A) Chapter 11, Title 15.2, Code of Virginia (Planning, Subdivision of Land and Zoning).

(B) Soil Conservation Districts Law, Va. Code Sections 21-2(c), 21-2(d).

(C) Virginia Environmental Quality Act, Va. Code Section 10-178.

(D) Erosion and Sediment Control Act, Va. Code Section 21-89.2.

**4-1903 Applicability and Exemptions.**

(A) **Applicability—Land Area and Features Included in the LOD.** This Section 4-1900 shall apply to all land area and karst features included in the Limestone Overlay District (LOD), as shown on the official Limestone Overlay District Map of Loudoun County (“LOD Map”), attached to this Ordinance as Appendix \_\_\_, and which, together with all explanatory matter thereon, is hereby incorporated by reference.

(1) The LOD Map delineates the following features:

(a) the extent of the Limestone Bedrock formations;

(b) sinkholes; and

(c) limestone outcrops.

(2) The LOD Map does not delineate required buffers around karst features (*See* Section 4-1905 below.).

(B) **Applicability—Covered Activities.** This Section shall apply to all proposed land disturbing activities, including non-agricultural rural economy uses, new single-family development, and subdivision that occur within the LOD. Expansion, alteration, or reconstruction of buildings, structures, and impervious surface areas existing on \_\_\_\_\_ (*Note: insert effective date of ordinance*) shall not be covered, provided that such alteration does not increase the total floor area of a structure by more than fifty (50%).

**Comment:** Amend the Land Subdivision Development Ordinance (LSDO) to add a cross-reference to this section that will require consideration of environmental features when platting lots. Applicant must avoid a lot pattern that makes protection of sensitive areas, such as karst features, difficult.

(C) **Exemptions.** The following land disturbing activities shall be allowed within the LOD, subject to the specific limits set forth below:

(1) **Existing Agricultural Operations.** This section shall not apply to agricultural operations located in the LOD and existing on \_\_\_\_\_ (**Note:** insert effective date of ordinance) that are covered by a Conservation Farm Management Plan, approved by the Loudoun County Soil and Water Conservation District that includes the application of best management practices, and a Nutrient Management Plan (where applicable).

(2) **Existing Legal Lots within Karst Feature Buffers.** A legal lot of record intended for residential development, which lot was: (a) in existence on \_\_\_\_\_ (**Note:** insert effective date of ordinance); and (b) located in whole or in part within a Karst Feature Buffer established by Section 4-1905(A), below, may be developed for a single-family detached dwelling if no other feasible alternative exists. However, such dwelling must be sited on the lot as far from the karst feature as feasible, and must comply with the development standards in this section to the maximum extent feasible. Development on such lot shall be subject to the (**proposed**) Conservation Design Process in Article VI, "Development Process and Administration." Development on such lot shall not be allowed if subsidence poses a serious risk to public health or safety or to the safety of residents of the proposed development.

(D) **Waivers.** Administrative waivers of standards are allowed, in accordance with Article VI, "Development Process and Administration" (*to be drafted*).

1       **4-1904   Review Procedures.** All development approvals, review procedures,  
2       modifications/waivers, and density calculations in the LOD are governed by  
3       Article VI, “Development Process and Administration,” *(to be drafted)*,  
4       including conservation design.

5       **4-1905   Establishment of Sensitive Limestone Areas.**

6               **(A)     Limestone Bedrock.** For all properties underlined by limestone  
7               bedrock, as identified on the LOD Map or by an approved  
8               Preliminary Soils Review, an applicant shall submit a Geotechnical  
9               or Geophysical Study. Such Geotechnical or Geophysical Study  
10              shall be developed in accordance with standards set forth in the  
11              Facilities Standards Manual, Chapter 6, Section 6.140, and shall  
12              identify the following features:

- 13                   (1)     Closed depressions;
- 14                   (2)     Open sinkholes;
- 15                   (3)     Limestone outcrops;
- 16                   (4)     Seasonal high water table indicators;
- 17                   (5)     Surface drainage into ground;
- 18                   (6)     faults; and
- 19                   (7)     Other hazardous subsidence conditions.

20                   If conditions warrant mitigation to protect sensitive environmental  
21                   resources associated with the underlying Limestone Bedrock, then  
22                   the report shall detail mitigation measures to be undertaken to  
23                   protect sensitive limestone areas.

24               **(B)     Karst Feature Buffers.** For each karst feature identified on the  
25               LOD Map or by an approved Preliminary Soils Review, a Karst  
26               Feature Buffer shall be established from the outermost edge of the  
27               feature. The minimum Karst Feature Buffer width shall be:

- 28                   (1)     Fifty (50) feet from any limestone outcrop; and
- 29                   (2)     One hundred (100) feet from the rim of any sinkhole.

**4-1906 Permitted Uses and Activities**

**(A) Uses and Activities within Karst Feature Buffers.**

(1) Land disturbing activities, development, and impervious surface coverage are prohibited within Karst Feature Buffers, except for the following:

(a) Fences that do not obstruct surface water flow;

(b) Trails and other passive recreation facilities, excluding buildings, for pedestrian, bike or other non-motorized use, provided that such facility is designed with permeable materials and is located a minimum of 25 feet from the edge of a karst feature.

(c) Recharge basins approved by the County.

(2) To the maximum extent feasible, residential lots shall be platted outside Karst Feature Buffers.

***Comment:** Amend the LDSO to state, “residential lots shall be platted to conform with environmental protection standards and provide an adequate developable area on each lot.”*

**(B) Uses and Activities in the Limestone Overlay District, Outside Karst Feature Buffers.** All uses and structures permitted by right in the underlying zoning district are permitted within the Limestone Overlay District outside of Karst Feature Buffers, subject to the standards and mitigation measures in this Section, except for subdivisions of eight (8) lots or more.

**4-1907 Special Exception Uses.** All uses and structures permitted by special exception in the underlying zoning district may be permitted subject to conditions identified in an approved locational clearance and in the grading permit application, when required, and subject to any mitigation measures required according to Section 4-1909, below. In addition, subdivisions of eight (8) lots or more shall require special exception approval in accordance with the provisions of this section and Section 6-1300 of this Ordinance.

1       **4-1908   Development Standards for the LOD.** In addition to development  
2       procedures set forth in Article VI, “Development Process and  
3       Administration,” *(to be drafted)*, and unless otherwise exempt by Section 4-  
4       1903(C) above, all land disturbing activities in the LOD shall adhere to the  
5       following standards:

6               (A)       **Structures in Potential Subsidence Areas.** No structure shall be  
7               built in an area where a Geotechnical or Geophysical Study indicates  
8               that potential subsidence may occur that would be harmful to public  
9               safety or to the safety of future residents.

10              (B)       **Site Grading.** Grading of the property shall not affect or alter water  
11              flow over and through the land into sinkholes or springs, as specified  
12              in Chapter 5 of the Facilities Standards Manual.

13              (C)       **Surface Water Run-Off.**

14                      (1)       Non-point source pollution load of nutrients and sediment  
15                      shall not exceed the pre-development load, as specified in  
16                      Chapter 5 of the Facilities Standards Manual.

17                      (2)       Surface water run-off shall not directly enter a sinkhole or  
18                      closed depression. Drainage plans shall be designed to  
19                      route surface water run-off through vegetative filters or  
20                      other filtration measures before it enters such features.

21              (D)       **Revegetation.** Disturbed areas not covered by paving, stone, or  
22              other solid materials shall be revegetated with plant species that are  
23              compatible with the natural vegetation and tree cover and that have  
24              low water and nutrient requirements

25              (E)       **Application of Wastewater Sludge.** Application of wastewater  
26              sludge is prohibited within the LOD.

27              (F)       **Communal Water and Wells.** Wells shall be installed in  
28              accordance with the provisions in the Facilities Standards Manual,  
29              *(proposed)* Section 6.211, “Subdivisions with Communal Water  
30              Systems,” and *(proposed)* Section 6.212 “Subdivisions with  
31              Individual Wells.” In addition to well protection standards in the  
32              FSM, structures and septic systems shall be located a minimum  
33              distance of 100 feet from all existing and proposed wells— both on-  
34              and off-site.

1 (G) **On-Site Sewage Disposal Systems.** On-site sewage disposal  
2 systems, as currently defined in the Land Subdivision Development  
3 Ordinance, are allowed for individual lots and subdivisions with  
4 fewer than eight (8) lots in the LOD. Sewage disposal systems shall  
5 be subject to the review processes and requirements in the existing  
6 LSDO (Section 1245.10) and shall comply with the following  
7 requirements:

8 (1) Within the LOD, in areas that the Health Director deems  
9 appropriate for sewage disposal systems, an applicant shall  
10 only use a sewage disposal system that is at least 90%  
11 effective in removing nitrogens.

12 (2) For existing and new systems, owners shall submit  
13 evidence of periodic pumping, inspection, and any  
14 necessary repairs and maintenance before expansion or  
15 conversion of a land use.

16 (H) **Communal Wastewater Systems–Package Sewage Disposal**  
17 **Systems.** Proposed subdivisions containing eight (8) or more lots  
18 shall be served by communal wastewater systems, or Package  
19 Sewage Disposal Systems, unless an applicant demonstrates to the  
20 County that other types of systems (individual or communal) are  
21 available that will achieve the same or superior treatment results.  
22 The County shall allow small package sewage disposal systems in  
23 the LOD when connection to community sewer is unavailable and  
24 according to the following standards:

25 (1) Where sufficient buildable land area exists on the portion  
26 of a property outside the LOD to accommodate a proposed  
27 package sewage disposal system, that area shall be used  
28 before any land within the LOD shall be used; or

29 (2) Where insufficient buildable land area exists, as much of  
30 the proposed package sewage disposal system shall be sited  
31 outside the LOD as much as possible.

32 (3) The applicant shall demonstrate through a Geophysical  
33 Study that the proposed package sewage disposal system  
34 will minimize run-off generated as well as enhance  
35 filtration. In addition, the applicant shall provide a plan for  
36 regular operation and maintenance.

(I) **Protection of Springs.** Land disturbing activities, development, and impervious surface coverage are prohibited within one hundred (100) feet from a spring, measured from the vertical source of a spring on flat terrain or from the first emergence of a spring on a steep slope (15% or greater).

(J) **Stormwater Management Ponds.**

(1) Stormwater management ponds shall not be located within depressions containing sinkholes, unless no alternative location exists.

(2) Stormwater management ponds constructed within the LOD shall be lined with synthetic, impervious materials to prevent groundwater pollution, in accordance with Chapter 5 of the Facilities Standards Manual.

(K) **Warnings to Property Owners.** A note shall be placed on the subdivision plat, containing the following, or similar, language: "Household lawn fertilizers, herbicides, and pesticides for residential purposes should be limited due to the underlying geology of this property, and the potential for groundwater contamination. Application of fertilizers and lime is allowed within the Limestone Overlay District only when applied based on results of a soil test obtained through the Virginia Tech extension service or other County approved laboratory."

**4-1909 Mitigation Measures for the LOD.** In addition to compliance with the development standards in Section 4-1908, land disturbing activities shall include specific measures to mitigate any potential adverse impacts to the County's subsurface water resources or other sensitive limestone area, as identified in a required Geotechnical or Geophysical Study.

(A) **General.** Mitigation measures shall be directly related to the proposed land disturbing activity and its potential adverse impact on karst features or sensitive limestone areas identified on the subject property.

(B) **Mitigation Measures.** The County decision-making body may require an applicant to include any of the measures listed below to mitigate identified potential adverse impacts as identified in the required Geotechnical or Geophysical Study:



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- (1) **Ineligibility for Density Increases.** The applicant may not be eligible for any density increases permitted under the clustering provisions in Section \_\_\_\_ of this Ordinance.
- (2) **Use of a Cluster Subdivision.** Where not otherwise required by Section \_\_\_\_ of this Ordinance, the County may require cluster development.
- (3) **Reductions in Impervious Surface Lot Coverage.** The County may require:
  - (a) Reductions in the maximum impervious surface coverage allowed; and
  - (b) Reductions in the area devoted to landscaped lawns, or the use of native plant materials and landscape materials that have lower water and nutrient requirements (i.e., xeriscape).
- (4) **Prohibition of Specific Pollution Sources.** The County may prohibit specific pollution sources (or “stormwater hotspots”), as defined in Chapter 5 of the Facilities Standards Manual (*proposed section* 5.320, “Best Management Practices”) if the applicant does not provide evidence that they will be properly monitored, or require adherence to facility design standards.
  - (a) The County may prohibit the following pollution sources, including, but not limited to:
    - (i) Uses and activities involving hazardous substances;
    - (ii) Uses and activities involving the application of high-nitrate herbicides or pesticides;
    - (iii) Automobile service stations;
    - (iv) Underground storage tanks;
    - (v) Landfills and waste sites; and
    - (vi) Other uses and activities with high risk of releasing pollutants.
- (5) **Storage Tanks.** The County may require leak testing and secondary containment of storage tanks.

- (6) **Conservation of Indigenous Vegetation.** The County may require retention of indigenous vegetation to the maximum extent feasible, and in accordance with *(proposed)* Tree Conservation Standards in Chapter 7 of the Facilities Standards Manual.
- (7) **Groundwater Monitoring.** The County may require a regular system of groundwater monitoring for the proposed development.
- (8) **Explosives and Blasting.** The County may require the following blasting mitigation measures:
- (a) A blasting plan for approval that contains blasting procedures;
  - (b) A pre-blasting site inspection to determine base-line conditions;
  - (c) Monitoring of initial blasts by appropriate seismic and noise measurements at sensitive locations identified in the blasting plan;
  - (d) Post-blasting inspections; and
  - (e) Restrictions on blasting and explosives, or limits on blasting to specific times and atmospheric conditions to minimize impact.
- (9) **Silviculture.** Silviculture may be conducted only in conformance with a Forest Management Plan that is consistent with requirements in the Facilities Standards Manual and approved by both the Virginia Division of Forestry and the County.
- (10) **Nutrient Management Plan.** The County may require a Nutrient Management Plan to be completed according to guidelines established by the Virginia Department of Conservation and Recreation. (*Note:* Criteria for the Nutrient Management Plan will be developed in the Facilities Standards Manual).
- (11) **Conservation Easements.** Conservation easements may be dedicated to the County with its written consent or to an third party approved by the County that permanently conserve sensitive limestone areas.